

31 March 1987

Mapping, Charting, and Geodesy

GEODETTIC AND GRAVIMETRIC SUPPORT

This regulation establishes policy, responsibilities, and procedures for identifying, processing, and fulfilling Western Space and Missile Center (WSMC) geodetic and gravimetric (G&G) requirements. This regulation applies to all elements of WSMC and Range users.

1. Geodetic and Gravimetric Support Policy:

a. WSMC receives most of its geodetic survey support from Detachment 1, Geodetic Survey Squadron (GSS), Defense Mapping Agency Hydrographic Topographic Center (DMAHTC) as documented in a Memorandum of Agreement between WSMC and DMAHTC. This agreement defines the policies and general procedures concerning the types and extent of geodetic survey support that GSS provides to WSMC and its Range users on the Western Test Range. Survey support projects of less than one labor-year duration will be accomplished by Det 1, GSS, without further approval from the Defense Mapping Agency (DMA).

b. WSMC/Engineering Instrumentation Division (ENI) designates and controls geodetic information used for range data productions. The WSMC Geodetic Coordinates Manual (GCM), Parts I, II, and III are the official documents that contain geodetic and site identification information approved for use throughout WSMC.

2. Geodetic Definitions:

a. Geodesy. Geodesy is that branch of applied mathematics which determines, by observation and measurement, the size and shape of the earth, the coordinates of points, the lengths and direction of lines on the earth's surface, and the variations of terrestrial gravity.

b. Geodetic Datum. A mathematical surface (ellipsoid of revolution) used for positioning points on the earth's physical surface and defining the dimensions of the earth. Geodetic datums can be global or regional in nature. The former has its origin at the center of mass of the earth while the latter has its origin at a point in a limited region of the earth's surface. A datum is defined by five parameters: the latitude and longitude of an initial point (datum origin), the azimuth of a line from this point to another point, and the parameters of the reference ellipsoid.

c. Geoid. The equipotential surface of the earth's gravitation and rotation which on the average coincides with the mean sea level in the open ocean. The direction of gravity is perpendicular to the geoid at every point and its surface is the reference for astronomical observations and for geodetic leveling.

Supersedes WSMCR 96-1, 1 Apr 80 (See signature page for summary of changes.)

No. of printed pages: 4

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Approved by: WSMC/EN (J. A. Salazar)

Editor: Mr J. Royal

DISTRIBUTION: F; X:

BMO/ENSR, Norton AFB CA 92409-6468..... 2
DMAHTC/GSS, F E Warren AFB WY 82005-6300..... 5
AFSC/TEO, Andrews AFB MD 20334-5000..... 2
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AUL/LDEA, Maxwell AFB AL 36112-5564..... 1

3. Geodetic and Gravimetric Support Responsibilities:

a. The Director of Engineering (WSMC/EN) is the focal point for geodesy and gravity (G&G) at WSMC and will:

- (1) Provide overall coordination of G&G activities and recommend policy.
- (2) Review, consolidate, and staff WSMC mapping, charting, and geodetic (MC&G) product requirements.
- (3) Review G&G plans and requirements and develop programs to acquire data in accordance with applicable Air Force regulations and Defense Mapping Agency instructions.
- (4) Review and validate all G&G survey requests from WSMC offices, contractors, and Range users and translate these requirements into survey specifications.
- (5) Initiate tasks to the appropriate survey agency to conduct surveys and provide data in accordance with survey specifications.
- (6) Compile geodetic constants for range operations' use and control publication and computational usage of geodetic information.

b. Through a Memorandum of Agreement, the Geodetic Survey Squadron is responsible for:

- (1) Maintaining and supporting a geodetic survey capability at WSMC.
- (2) Providing survey support, responsive to WSMC requests, consisting of:
 - (a) Astronomic and geodetic positions and orientation.
 - (b) Precise leveling.
- (3) Furnishing appropriate technical expertise to assist in defining survey requirements as requested by WSMC.
- (4) Computing and providing survey results to WSMC consistent with the schedules established.

c. WSMC elements and Range users requesting geodetic and gravimetric survey are responsible for:

- (1) Identifying their survey requirements to the Director of Engineering well in advance (usually 120 days) of the date that the data are required.
- (2) Forwarding all long-range G&G requirements to the Director of Engineering for review. Long-range MC&G requirements are submitted annually to the Defense Mapping Agency.
- (3) Assisting survey teams in gaining access to restricted sites and providing construction schedules as applicable.

NOTE: Civil Engineering and topographic surveys are not included with these responsibilities.

4. Geodetic and Gravimetric Support Procedures:

a. Geodetic and gravimetric survey requests:

(1) WSMC elements and Range users requiring G&G survey will prepare requests specifying:

(a) Specific points to which survey measurements are to be made.

(b) Six-digit site or facility code identification currently used.

(c) One-sigma accuracy required for each element requested. Specify control point that accuracy is to be referred to, such as local control or datum origin. Accuracies should be expressed in terms of meters, seconds of arc, etc., instead of first, second, or third order.

(d) Geodetic datum which reduced data and accuracies should be referred to (NAD 1927, WGS 84, Mercury, etc.).

(e) Requirement: Program Requirements Document (PRD), Operations Directive (OD), new instrumentation, etc.

(f) Suspense date for final data and the date that the facility will be available for survey.

(g) Whether survey is one-time or periodic. If periodic, state frequency.

(h) Recipient of final data.

(i) Point of contact for coordination and additional information.

(2) Survey requests and geodetic requirements will be forwarded to WSMC/ENI, Vandenberg AFB CA 93437-6021.

(3) A period of not less than 45 days, required for data reduction and analysis, must be allowed between survey completion date and receipt of final data.

(4) In addition to specific survey requests, all long-range geodetic and gravimetric requirements in support of directed or planned projects should be forwarded to the Director of Engineering (WSMC/EN) as soon as they are identified.

b. Geodetic constants maintenance and site identification requests:

(1) Geodetic constants maintenance:

(a) The WSMC Instrumentation Engineering Division (WSMC/ENI) will establish guidelines and authorization for publication of the WSMC Geodetic Coordinates Manual (GCM), Parts I and II.

(b) Engineering Instrumentation will provide complete geodetic measurement data to update the systems computational repository files.

(2) Site identification requests:

(a) The Western Test Range Computer Services Division (WTR/SFC) will establish guidelines and authorization for publication of Part III of the GCM.

(b) Requests, indicating need date, new code or change to existing code, intended use, location, and justification, will be submitted to WTR/SFC.

(c) The Computer Services Division will approve the request, assign a control number and the new or changed code, and update Part III of the GCM.

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SUMMARY OF CHANGES
This revision reflects organizational changes.